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way should be invented of doing away with this additional danger of ocean travel.

It is not uncommon to hear complaints of the methods of teaching geography in our lower schools. The faults most frequently mentioned are, that the beginning is not made properly; that there are too many lists of places committed to memory; and that the teaching is too lifeless, and is not made real enough by illustration and description apart from the text-book. The first error can be easily corrected by adopting the German method of instruction, where, instead of beginning with the definitions of meridians and parallels, that are so often found misplaced on the opening pages of our text-books, the pupils first study the arrangement of the schoolroom, then of the playground, next the geography of the town and of the surrounding country, and thus learn the meaning of the maps from which they afterwards study about the more distant parts of the world.

But this does not go very far. After laying the proper foundation, is there any way of learning geography, except by committing to memory the names and relative positions of the many mountains, rivers, capes, bays, lakes, cities, and towns, that give features to the earth? Detail may, of course, be carried too far, if a precise knowledge of distant, and to us unimportant, countries be required; but for the average scholar of this country, who should become well acquainted with the geography of North America and Europe, there is no easy path, no royal road, over the broad, rough field of fact that he must cross. We fancy, therefore, that the second criticism touches, not a fault, but a difficulty inherent in the study. Names and positions of places must be learned; but, as books of moderate cost can give very little more than the barest mention of them, the study is apt to become lifeless, and to degenerate into the learning of dull words from a dead map, unless the teacher averts this unfortunately common result, and enlivens the work by instruction beyond the text-book. This,

however, is more than we have a right to expect from the overworked and underpaid teachers in the lower schools, for it is no easy task. It demands much reading in many books; it requires illustration by numerous maps, photographs, and diagrams, far beyond the reach not only of the teacher, but of the school board as well. In short, the desirable, the ideal teaching of even so commonplace a subject as elementary geography is an expensive art, requiring much study, high skill, and an extensive outfit.

It is now recognized that the successful teaching of chemistry, physics, and natural science, needs that the teachers of these branches shall know them by practical, experimental, observational work. A fair application of the same principle would require that the teacher of geography should have travelled; but how far are we now from so desirable an end! It is safe to say, that, of all the teachers of our common schools, not one-quarter have seen an ocean, a harbor, or a high mountain, and not one-twentieth of them have had any personal acquaintance with the foreign countries that they have to describe. Under these conditions, it is certainly no wonder that the study of geography becomes so often a tiresome exercise of unintelligent memory; and it cannot be otherwise, without a cost that few school boards can allow.

LETTERS TO THE EDITOR.

**.* Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

Naval officers and the coast-survey.

IN your issue of the 11th you refer editorially to the proposition contained in the report of the secretary of the navy for 1883, to transfer all national work connected with the ocean, and conducted by other departments, to the control of the navy department; and in a subsequent paragraph you make some criticisms upon the character of the work performed by navy officers in the coast-survey. The question as to whether the navy or the treasury department shall control the work, I do not propose to discuss; but I must enter my protest against the assertion in a journal like *Science*, which goes forth to the world as authority, that the "work which these [navy] officers perform is routine, the plans and methods for which have been devised and developed by civilian experts," and to the assertion contained in the phrase, "the present method of employing our superfluous navy, under the intelligent supervision of

civilian experts."—To answer these points in order, I will say, first as a matter of history, that the 'plan' of the coast-survey was compiled over forty years since by a mixed board composed in part of navy officers. This plan was legalized by Congress in 1843-44, and has been mainly in force ever since; though some modifications have necessarily been made by the judgment and experience of the eminent men who have held the offices of superintendent and principal assistants. By the plan referred to, it was made the *legitimate* duty of officers and men of the navy to execute the hydrographic part of the work; and to them has ever since been assigned the bulk of that work, except during the few years when the civil war and the subsequent scarcity of officers made it impossible to do so. That period (i.e., from 1861 to 1871) developed a good many civilian hydrographers who have no superiors in the world, but nearly all of these resumed their more legitimate work upon the return of navy officers to the survey. The *methods* of hydrography are the growth of hundreds of years, and have been contributed to by the seamen of all maritime nations; and, while the inventors of a good many instruments and special methods are known, it would be exceedingly difficult to trace the *system* to its source. The 'tricks of the trade,' so to speak, have been handed down from one to another with gradual improvement,—as a rule, too slow to give any definite point from which that improvement can be shown, though during the forty years of its existence the coast-survey has vastly improved the character of its work; but probably the improvement in its means (i.e., the introduction of steam-propelling power, etc.) deserves a good deal of the credit for improved methods. While civilians have had a share in the development, it is a long way from the fact, to ascribe all to them, as it is to assume that hydrography is a work which does not require skill, judgment, and care. Those who think the last have never worked in intricate waters. The officers engaged upon the coast-survey have been so assigned because it was a part of their regular duty, and not because 'superfluous.' Having had for five years the privilege of nominating the officers to be employed upon the coast-survey, I can speak with some authority. Officers were chosen strictly for their qualifications; and often, had it not been for the great interest taken in the coast-survey by the successive chiefs of the bureau of navigation, the officers selected would not have been spared from other duties. That all work of the coast-survey is supervised by the superintendent, an expert of high order, is an undoubted fact; but his instructions to hydrographers, unless he has some special object in view, simply assign geographical limits, but do not prescribe methods, a general printed manual covering all that is required in the latter. The work, after completion, has of course to pass the rigid scrutiny of the superintendent; but the same is the case with all other work. To this extent the work of navy officers may be said to be 'supervised by civilian experts,' but no farther. In 1873 several navy officers, who without previous experience were ordered to the coast-survey, placed themselves for a short time under the instructions of civil assistants, who had been doing their work for some years; and all of them freely and gratefully acknowledge the assistance they received. I am free to acknowledge obligations of a similar character,—of many a *point* received from my valued civil associates during the Darien Canal expedition of 1870. Nautical surveying has always been taught theoretically at the Naval academy; and as much practice as possible has generally, though not always, been given. Fur-

thermore, nautical surveying and navigation are very near cousins, so that all the instruction needed to make a navigator a surveyor is to give him what I have called the 'tricks of the trade;' and these are being handed down by officers as they have been by their predecessors.

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U.S. coast geodetic survey.*

[The plan of organization of the coast-survey and the plan of work of the survey are quite different things. It is the duty of the chief of the survey to arrange and supervise the latter. That the scope and character have been extended since its organization in accordance with the views of the chief is beyond question. While from the above letter it might be inferred that the nautical work of the coast-survey is confined to marine surveying in its older sense of locating rocks and shoals, and determining the boundaries of courses of the navigable waters by time-honored methods, yet from the publications of the coast-survey, and from other sources, we had gathered that the study of ocean physics, and of the conformation and character of the ocean bottom, together with the different forms of marine life, had formed, of recent years, an important part of the work of the survey, and that it was carried out in accordance with the plans of the chiefs of the survey, and by the methods devised and developed by them and by the two Agassizs, Pourtales, Thompson, Milne-Edwards, and many other eminent specialists, modified in minor details by the circumstances of each case.

It is an error to suppose we regard the employment of naval officers in this work unfavorably; for, on the contrary, we think it highly desirable that they should be employed in this routine work of collecting data and material for discussion and study by specialists; and their skill, judgment, and care, their knowledge of organization and discipline, and their close adherence to instructions, render them extremely useful. It is wise, also, that, in the present reduced condition of the navy as to ships, and its overcrowded condition as to officers, the secretary should find employment for this superfluity in the coast-survey, the fish-commission, the geological survey, the national museum, as instructors in our colleges, and as assistants in special researches. Such employment cannot but result in benefit to the navy, and assist in the advancement of science.

Yet we have still to be persuaded that it will promote the efficiency or the economy of the scientific organizations of the government if they are transferred from the supervision of the present expert civilian heads to that of the officers of the navy.]

Italics for scientific names.

I agree with the editorial remarks under this heading in *Science*, No. 49, that the proper mission of italics is for 'emphasis, or as catch-words;' and their use for scientific names of animals and plants is, it seems to me,—contrary to the opinion conveyed editorially,—of great practical utility, especially in indexing, or in searching the pages of an article or memoir for references to particular species that may be under treatment. Italicizing such words makes them 'catch-words,' and gives great facility in discovering incidental reference to species, the eye quickly catching the italicized name, and as quickly recognizing whether it is the one sought. Considering scientific names as 'a simple convenience,' and as having no higher value, their use is so necessary as